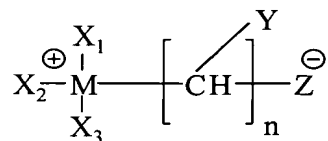


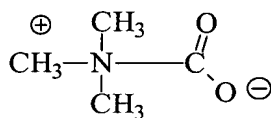
Claims:

1. An aqueous composition useful for polishing silica and silicon nitride on a semiconductor wafer comprising by weight percent 0.01 to 5 zwitterionic compound, 0.01 to 5 carboxylic acid polymer, 0.02 to 6 abrasive, 0 to 5 cationic compound and balance water, the zwitterionic compound having the following structure:



wherein n is an integer, Y comprises hydrogen or an alkyl group, Z comprises carboxyl, sulfate or oxygen, M comprises nitrogen, phosphorus or a sulfur atom, and X₁, X₂ and X₃ independently comprise substituents selected from the group comprising, hydrogen, an alkyl group and an aryl group.

2. The composition of claim 1 wherein the zwitterionic compound has the following structure:



3. The composition of claim 1 wherein the cationic compound is selected from the group comprising: alkyl amines, aryl amines, quaternary ammonium compounds and alcohol amines.

4. The composition of claim 1 wherein the abrasive is ceria.

5. The composition of claim 4 wherein the ceria has an average particle size of between 50-200 nm.

6. The composition of claim 1 wherein the aqueous composition has a pH of 4 to 9.

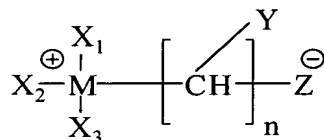
7. An aqueous composition useful for polishing silica and silicon nitride on a semiconductor wafer comprising by weight percent 0.01 to 5 N,N,N-trimethylammonioacetate, 0.01 to 5 polyacrylic acid polymer, 0.02 to 6 ceria, 0 to 5 cationic compound and balance water, wherein the aqueous composition has a pH of 4 to 9.

8. A method for polishing silica and silicon nitride on a semiconductor wafer comprising:

contacting the silica and silicon nitride on the wafer with a polishing composition, the polishing composition comprising by weight percent 0.01 to 5 zwitterionic compound, 0.01 to 5 carboxylic acid polymer, 0.02 to 6 abrasive, 0 to 5 cationic compound and balance water;

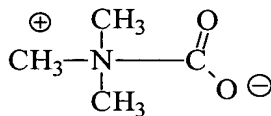
polishing the silica and silicon nitride with a polishing pad; and

wherein the zwitterionic compound has the following structure:



in which n is an integer, Y comprises hydrogen or an alkyl group, Z comprises carboxyl, sulfate or oxygen, M comprises nitrogen, phosphorus or a sulfur atom, and X₁, X₂ and X₃ independently comprise substituents selected from the group comprising, hydrogen, an alkyl group and an aryl group.

9. The method of claim 8 wherein the zwitterionic compound has the following structure:



10. The method of claim 8 wherein the cationic compound is selected from the group comprising: alkyl amines, aryl amines, quaternary ammonium compounds and alcohol amines.